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14. ABSTRACT As new challenges and threats evolve in the 21st century, the Military Health System must understand and respond to these factors in order to properly resource the military treatment facilities from both the patient and the health care provider perspectives. The Military Health System is focusing on these quality, access, and cost issues through interrelated initiatives such as the Balanced Scorecard, new TRICARE contractor incentives, corporate-wide strategic plans, and prospective payment. As part of the drive to resource the facilities, the corporate leadership began investigating the idea of adopting a prospective payment platform. The purpose of this study was to assess whether the current historical retrospective funding was adequate or whether a prospective budgeting platform was a more cost effective and feasible alternative. This study specifically analyzed the individual cost components of the Civilian Health and Medical Program of the Uniformed Services reimbursement model as the potential prospective payment chassis. The study used the 10 most common DRGs for the year 2002 for the nation with facility specific information from BAMC.						
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The Application of an Army Prospective Payment Model Structured on the Standards Set Forth
by the CHAMPUS Maximum Allowable Charges and the Center for Medicare and Medicaid

Services: an Academic Approach

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Abstract

As new challenges and threats evolve in the 21st century, the Military Health System must understand and respond to these factors in order to properly resource the military treatment facilities from both the patient and the health care provider perspectives. The Military Health System is focusing on these quality, access, and cost issues through interrelated initiatives such as the Balanced Scorecard, new TRICARE contractor incentives, corporate-wide Strategic Plans, and prospective payment. As part of the drive to resource the facilities, the corporate leadership began investigating the idea of adopting a prospective payment platform. The purpose of this study was to assess whether the current historical retrospective funding was adequate or whether a prospective budgeting platform was a more cost effective and feasible alternative. This study specifically analyzed the individual cost components of the Civilian Health and Medical Program of the Uniformed Services reimbursement model as the potential prospective payment chassis. The study used the 10 most common Diagnosis-Related Groups for the year 2002 for the nation with facility specific information from Brooke Army Medical Center. Based on the study assumptions, it demonstrated that prospective valuation for the Military Health System falls short of the more traditional model of historical funding practices.

Disclosure as Called For by Army Regulation 360-1

The opinions or assertions contained herein are the private view of the author and are not to be considered as official policy or positions, or as reflecting the views of the Department of the Army, the Department of Defense, or the United States Government. For clarification on any issues, interested parties may contact the author via e-mail at matthew.gorski@cen.amedd.army.mil

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The Application of an Army Prospective Payment Model Structured on the Standards Set Forth
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Services: an Academic Approach

Introduction

Many American health care organizations struggle to discover the most effective business model that will support the needs of their external and internal customers from quality, access, and cost perspectives. Corporate America is not alone in this endeavor, the United States Military Health System (MHS) and its various health care leaders have grappled with adapting a cost effective synthesized business model that will support the health care needs of its 8.7 million beneficiaries (TRICARE, 2004a). To support its nearly nine million beneficiaries, the Military Health System initiated one major policy change during fiscal years 2002 and 2003 as part of its strategic foresight. The single change that served as the catalyst to prompt major health care reform across the three military services, Army, Navy, and Air Force, was the introduction of TRICARE's next generation of contracts or T-NEX. The MHS sought to transition from twelve TRICARE service regions under T-NOW, to three TRICARE Regional Offices under T-NEX (Market Management in a Revised Financing Environment, 2004).

The MHS and other visionary health care organizations participate in some form of a strategic management process in order to help them identify, plan, and conform to changes in their respective environments, and to also remain competitive. The strategic management process is a continuous cycle, and as part of this cycle, the MHS identified an enterprise-wide need to streamline the many facets of and the management of health care delivery. Thus, the plan to migrate towards three regions was launched.

Under T-NEX, the three regional offices will be identified as North, South, and West in which the three regional directors will have the autonomous ability to facilitate the health care needs of their respective beneficiary populations. The new contracts attempt to make the TRICARE benefit easier to access, more customer focused, and more responsive to patient's needs (TRICARE, 2004b). Some of the changes under this reformation will help improve the portability of the benefit as soldiers move from station to station and potentially save the government money by establishing three contractors instead of seven. Additionally, any future congressionally mandated modifications to the health benefit would mean implementation proceedings only three times as opposed to the traditional twelve. Less implementation suggests less growing pains, but more importantly, it may result in a substantial cost savings or cost avoidance for the federal government. One major change under T-NOW is the fact that the new contracts will include the requisite incentives for superior and measurable performance while encouraging the MHS to adopt industry best practices from comparable quality-focused civilian health care facilities (TRICARE, 2002).

One of the bigger benefits is that the three regions will eventually build macro-level integrated business plans to encompass their entire region's resource requirements and plans for effective delivery of health care (Market Management in a Revised Financing Environment, 2004). Under this theoretical configuration, the local military treatment facility (MTF) commanders will also develop a micro-level version of a business plan. As part of the business plan process, Commanders will be asked to forecast health care needs and purchased care requirements, forecast the number of enrollees, and accept a budget that is based on outputs, not inputs (Decision Support Center, 2004). A major claim behind the plan is that commanders will be held accountable for their respective hospital strategy-focused blueprints. This Kaplan and

Norton style of top-down driven and bottom-up implementation of the MHS integrated business plan specifically supports two of the MHS' Strategic Plan objectives (Kaplan & Norton, 1996).

The two goals that the integrated business plan endorses are goals two and five, which state (Goal 2) to enhance financial stewardship and (Goal 5) to improve efficiency. When combined, the two goals demonstrate that the MHS is focused on obtaining maximum resource efficiency and that the MHS leadership will be held fully accountable for both the clinical and administrative decisions and both the intended and the unintended impacts on the patient care mission (Military Health System Business Planning, 2004).

A common strategy for the MHS business planning process is to optimally allocate and utilize the Defense Health Program dollars and to provide management accountability at each of the different executive levels of leadership. From a strategic perspective, the business plans will not only assist the clinical and administrative teams in their efforts to accurately document the scope of care at each of the respective military treatment facilities, but also help them account for staffing, productivity, and ultimately funding (TRICARE Governance Plan, 2004). As part of a strategically focused corporation, the MHS is fully aware that in order to empower the various levels of leaders and provide them autonomous decision-making authority, it must first properly resource them (Ginter, Swayne, & Duncan, 2002).

Conditions that Prompted the Study

As new challenges and threats evolve in the 21st century, the MHS must understand and respond to these factors in order to properly resource the military treatment facilities from both the patient and the health care provider perspectives. Aside from the global war on terrorism, the MHS faces an aging population, growing number of retirees, rapid technological advances, policy modifications, Congressional mandates, and the well-known fact that health care costs are

outpacing inflation. These independent variables collectively and individually impact the Military Health System's ability to effectively and efficiently finance health services (Military Health System Business Planning, 2004). Following the Shi and Singh (2001) iron triangle of health care delivery, the MHS is strategically focusing on quality, access, and cost issues through interrelated initiatives such as the Balanced Scorecard, new TRICARE contractor incentives, MHS Strategic Plan, and prospective payment. The newest program is the development of a prospective payment system modeled for the MHS. The argument and push for a prospective model is that it will help optimize and reduce current cost levels in the individual MTFs (Military Health System Business Planning, 2004). The intent is that under prospective payment, health care requirements will be budgeted for based on the value of the needs of the respective beneficiary populations, not budgeted based on historical monetary figures (Implementation of Prospective Payment System, 2004). In theory, an effective prospective payment scheme will help guide the MHS towards programming the monetary needs based on clinical demands, not historical budgets inaccurately inflated in an attempt to encompass the time value of money.

The challenge, now, is to provide the clinicians and administrators of the MTFs with the proper resources and tools to support the evolving and growing patient care mission. To optimize taxpayer dollars, the MHS is aggressively investigating the idea of initiating its own prospective payment methodology based largely on the Center for Medicare and Medicaid Services' (CMS) prospective payment models. The closest MHS product to the CMS prospective payment scheme is the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS) Maximum Allowable Charge (CMAC) prospective payment rates. TRICARE payment weights, payment rates, all but two Diagnosis-Related Groups (DRG), and

even wage indexes are modeled on the Medicare (CMS) prospective payment methodology (TRICARE Rates, 2005).

Before moving forward, it is necessary to provide a synopsis of the TRICARE CHAMPUS concept. Simply stated, CHAMPUS is the federal government's payment mechanism to reimburse military family members that receive health care from non-government providers (CBO, 1983). This is the maximum amount that TRICARE will authorize for inpatient or outpatient care. The authorized charge is the lowest billed charge or the allowable charge, whichever is lower (Health Net Federal Services, 2005). Given applications of the CHAMPUS model, the charge in early 2004, from Mr. Nelson Ford, the Deputy Assistant Secretary for Health Budgets and Financial Policy, was to show that the current CHAMPUS reimbursement practice would be an insufficient approach to fund the MHS' operations. Mr. Ford asked the three different services to identify the individual cost components within the CMAC rate and compare them to the current historical charge-based model that the MHS is presently honoring. Part of the catalyst towards a prospective funding approach was Health Affairs drive to materialize a \$3.3B savings from fiscal year 2006 to fiscal year 2011 (Prospective Payment System Workgroup IPR, 2004).

In fact, in April of 1983 when Medicare prospective payment first began, the House Armed Services' Committee on Military Personnel and Compensation first began exploring the connection between CHAMPUS and prospective payment as a way to reign in the rising costs of the military health system. The major assumption was that a prospective payment approach was applicable to CHAMPUS and the way the military expensed its health care costs. The basic premise behind the initiative was that physicians began ordering costly and potentially unnecessary sophisticated diagnostic and therapeutic services. Essentially a lack of incentives

for the professional staff to consider was one of the reasons that unnecessary procedures were never curtailed. In theory, prospective payment will provide the requisite incentives to induce economies of scale and economies of scope. The push today is to create a direct and a purchased care system that is founded on prospective payment, where the system 22 years ago was to only cover purchased care. The concern back then was that CHAMPUS care reflected one percent of civilian health care, and thus military affiliated patients might be turned away from civilian health care facilities (CBO, 1983).

Problem Statement

Based on Mr. Ford's request to the three military services, the purpose of this paper is two-fold. The first is to disassemble the CHAMPUS model into its various cost components and to empirically assess whether the current historical methodology of MTF funding is superior, or whether the CMAC inpatient prospective payment model is a feasible cost savings alternative. The second purpose is to suggest whether a prospective payment process would lend itself as an effective tool to fund the patient care mission of the MHS. Additionally, if the analysis demonstrates that the CMAC inpatient prospective model is ineffective, the study will also suggest avenues of approach that may help apply a prospective payment scheme.

Literature Review

Similar to the MHS, the Federal government's nation-wide system of funding health care for the elderly or poor, Medicare and Medicaid, were primarily funded or reimbursed on a cost-basis chassis. Under a cost-based reimbursement system, health care providers are simply paid (reimbursed) based on what they bill the different health insurance organizations, which in this specific example is Medicare (Malatestinic, Braun, Jorgenson, & Eskew, 2003). Prior to Medicare implementing a prospective payment program, it reimbursed providers for costs

incurred while providing services. As the federal government and the individual health care providers eventually realized, health networks could essentially follow the basic economic principle of inducing patient demand. For example, the average length of stay for a Medicare patient was 10.3 days prior to Medicare's prospective payment system (PPS), and it dropped to 6.5 days several years after PPS implementation (Gapenski, 2003). The incentive was simple, generate high cost patient workload or even perform unnecessary procedures to generate a higher bill that Medicare would ultimately honor. A cost-related reimbursement model essentially provides hospitals and health care practitioners with little incentive to curb costs or exercise fiscal constraint when developing a treatment regime. The perception during that timeframe was that Medicare, or the federal government, would reimburse regardless of the associated costs (Grimaldi, 2002).

Under President Ronald Reagan in 1983, Congress established the Medicare prospective payment system (Social Security Amendments of 1983) in an effort to curb the behavior towards "blank check writing". The Medicare PPS was initially conceived as a way to influence hospital behavior through financial incentives that were supposed to encourage the cost-efficient management of resources (Malatestinic, Braun, Jorgenson, & Eskew, 2003; Tieman, 2003). Essentially, the new proposed PPS aimed at simplifying the very intricate and questionable cost-based reimbursement system, improving hospital efficiencies, and ensuring that payments were sufficient to compensate hospitals. Furthermore, it sought to reduce Medicare coinsurance amounts for beneficiaries, provide cost containment incentives to providers, and maintain the quality of care that was established under the original cost-based Medicare reimbursement methodology. The biggest and probably the most obvious incentive was that hospitals and other health care providers were allowed to pocket any reimbursement dollars that were above the

costs of care. Conversely, providers also had to absorb any costs that were above the reimbursement cap for that respective treatment regime. This factor alone drove the cost cutting and efficiency efforts that most health care providers began to initiate (Gapenski, 2003; Baker, 2002; Grimaldi, 2002).

The basic premise of PPS is to reimburse hospitals with a predetermined rate for each admission or outpatient encounter, which is based on the patient's diagnosis. Henderson (2002) operationally defined prospective payment as a rate determined prior to any provision of health care services. Essentially, the old method was cost-based and retrospective in nature while the prospective approach is a diagnosis-specific predetermined rate (IRP, 1994). The inpatient and outpatient models under Medicare PPS are very similar in theoretical design, but use different methods of calculating the fixed rates that ultimately determine the reimbursement amount(s). Prior to discussing the intricacies of the Medicare and CHAMPUS PPS models, it is essential to mention the different payment units and clarify the link from the payment unit to the associated health care sector. The hospital inpatient sector utilizes Diagnosis-Related Groups (DRG), the hospital outpatient segment employs the Ambulatory Payment Classifications (APC), and the physician element is linked to the Resource-Based Relative Value Scale (RBRVS) (Cleverly & Cameron, 2003).

The foundation for reimbursement under the inpatient method of PPS was founded based on a Yale University DRG statistical advancement, which was initially introduced as a quality comparison tool (Baker, 2002). DRGs are categories of patient conditions that represent the resources consumed to treat each respective patient compared to the average resources consumed for each diagnosis. This implies that the average would be a unit of one, while deviations either greater or less than this established baseline signify the amount of resource consumption when

benchmarked against the average. One DRG may encompass several different treatments for one illness, but overall payments (over and under) should reach a mid-point or average of the resources used. Simply stated, these numbers would reflect the average patient within a given DRG (Durthaler & Miller, 2003). Following this thought process would suggest that the weight of each respective DRG has a tremendous impact on the amount of resources consumed, and thus the amount a hospital is reimbursed. DRGs are grouped as surgical or medical procedures. Approximately 40% of the DRGs are surgical and the larger volume of patient encounters in the medical arena accounts for the difference (Gapenski, 2003; Baker, 2002).

When Medicare PPS first began, reimbursement was prospective in nature, but in order to ease into the new plan, rates were based largely on historical costs. Around 1987, hospitals began to be reimbursed under the PPS plan, which incorporated rates founded on a national average and adjusted for local wages and location (Meltzer, Chung, & Basu, 2002). Medicare does update the DRG weights and measures annually to account for resource consumption, technological advancements, and to even track treatment patterns. The assignment of a particular DRG to a case is comprised of principal diagnosis at admission, presence of pre-defined secondary diagnoses, presence or absence of surgery, age of the patient, and the patient's discharge status. The DRG system brings all diagnoses from the International Classification of Diseases, 9th Revision, Clinical Modification tabulation and then classifies them into 25 major diagnostic categories based on the major organ systems (Cleverly & Cameron, 2003; Malatestinic, Braun, Jorgenson, & Eskew, 2003). Because one patient can have multiple procedures performed on them, a hierarchy of procedures exists within each major diagnostic category to allow the most-resource intensive procedure to be used for the actual assignment of a DRG. The Center for Medicare and Medicaid has computer software available that assists

hospital personnel in the assignment of the appropriate DRG. The software is a good tool for individuals within a medical facility, but it provides no value to those analysts that do not have access to provider identifier numbers, and thus cannot run scenario analyses. Although a DRG is a vital element in the PPS, it is not the only variable in the overall payment umbrella (Cleverly & Cameron, 2003; Malatestinic, Braun, Jorgenson, & Eskew, 2003).

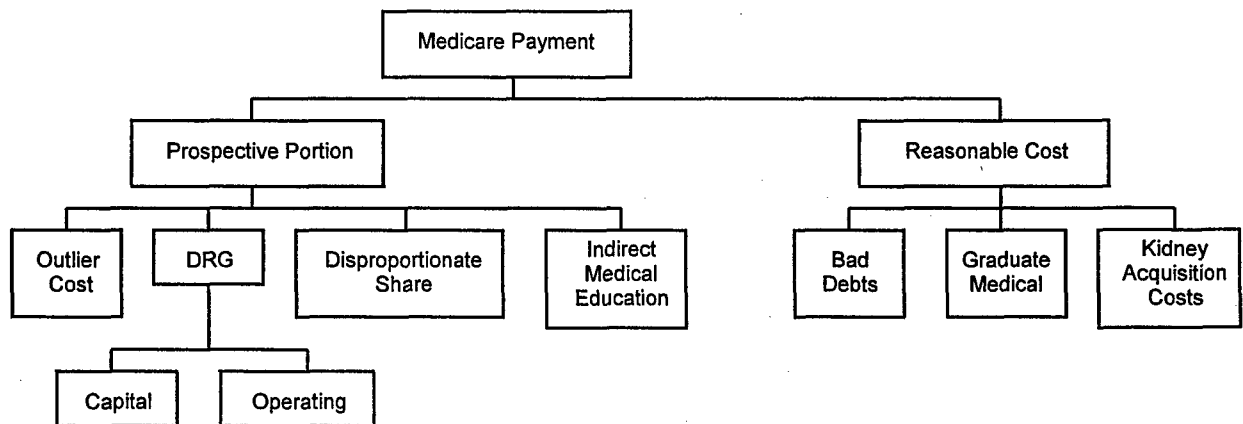


Figure 1. Conceptual framework.

As graphically depicted in the conceptual model located in figure 1, the total payments to a hospital under Medicare PPS can be fractioned off into a prospective element and a reasonable cost portion (Cleverly & Cameron, 2003, p. 22). The prospective side is further broken down by outlier costs, DRGs (capital and operating), disproportionate share, and indirect medical education. On the other hand, bad debts, graduate medical education, and kidney acquisition costs further divide the reasonable cost side.

The foundation of the inpatient PPS calculation is the weight of each DRG. As previously mentioned, the DRG weight simply represents the average costliness of resources required to care for inpatients in that grouping compared with the average cost of resources required to care for inpatients in a specific grouping compared to the average costs of resources

required to care for inpatients in all DRG groups (Baker, 2002). A simplified formula shows the operating payment as the DRG weight * [(labor amount * wage index) + non-labor amount]. Some of these figures further depend on whether the hospital is considered large urban or other area. Large urban is operationally defined as a metropolitan area with a population of more than one million people (Cleverly & Cameron, 2003). The payment can be further increased by adding money for indirect medical education, a disproportionate share, and even outlier payments. Hospitals located in higher cost of living areas may also qualify for cost of living allowance adjustments (RPC, 2004).

The indirect medical education element is added on for those hospitals that qualify as teaching institutions. This particular reimbursement amount is directly tied to the number of residents, interns, and beds that the organization supports. This figure does not include normal resident and intern salaries as it is intended to cover the additional costs that teaching hospitals normally incur. The disproportionate share reimbursement is geared towards those institutions that treat an above average number of Medicare or Medicaid patients (Cleverly & Cameron, 2003; Malatestinic, Braun, Jorgensen, & Eskew, 2003). This suggests that Medicare and Medicaid may not pay as much for their respective patient base when compared to other traditional insurance mechanisms. An average hospital is able to cost-shift some of its expenses to other areas or patients of the hospital. For example, a patient that has no insurance is still able to receive some level of treatment, free of charge. Conversely, a different patient, but an identical case with health insurance will be billed. The bill may be slightly inflated to offset the costs that the organization incurred to treat the charity case (Shi & Singh, 2001). Thus, a health care organization that treats a large amount of Medicare patients needs that additional capital in order to remain fiscally solvent.

Outlier costs are generated from a similar concept. This payment is intended to cover costs that are also beyond the average. The outlier payment was conceived as a way to finance those patients that require an unusually large amount of resources. In 2001, for example, Medicare would reimburse eighty percent of the difference between costs and charges, if the actual cost of the case exceeds the DRG calculated payment by \$14,050. The final variable under the prospective portion is the capital payment, which is also a flat rate adjusted for a DRG weight, geographic adjustment factor, large urban add-on, cost of living allowance, indirect medical education factor, and a disproportionate share factor (RPC, 2004).

The CMAC model is very similar to the CMS model; in fact, it is founded on the same logic. The only differences occur because of the uniqueness of the military mission compared to the needs of the external stakeholders supported by CMS. Just looking at the operating DRG payment and the capital DRG payment for both systems, the steps are very similar. The following steps outline the basic theory behind both the CMS and CMAC prospective payment models in a formula based structure. Step 1 is to determine the respective DRG for the claim. The second step is to establish if the hospital is large urban or other. Step 3 is where the two models slightly diverge. The operating DRG payment formula for CMS is [(operating standardized labor share * operating wage index) + operating standardized non-labor share * (operating cost of living adjustment)] * (DRG weight) * (1 + capital indirect medical adjustment factor + operating disproportionate share hospital adjustment factor). Mathematically speaking, the capital payment is derived by the capital standard federal rate * DRG weight * [geographic adjustment factor * large urban add-on * cost of living adjustment * (1 + indirect medical education + disproportionate share)] (RPC, 2004). At step 3, the CMAC approach is to take the labor-related portion of the adjusted standardized amount + labor-related portion of children's

hospital differential * the appropriate wage index. The fourth step is to add the nonlabor-related portion of the adjusted standardized amount and the nonlabor portion of the children's hospital, if applicable. Step 5 consists of multiplying the DRG weight by step 4. The 6th step is multiply step 5 by 1 + the indirect medical education adjustment factor (for teaching facilities). The 7th step is determine any cost outlier payment amount and add it to step 6 for a teaching hospital or step 5 for non-teaching hospitals (TRICARE, 2004c).

Even though Medicare prospective payment was engineered to curb costs while creating other financial incentives, it still naturally affected the access to and quality of patient care in the many different hospitals that treated Medicare sponsored patients. Under the cost-based system, patient advocates argued that physicians were inducing demand, and thus profiting from potentially unnecessary care. Now that the federal government initiated a new and relatively universal payment mechanism, some patient advocates are now concerned that, the latest financial incentive is to inflate profit margins. This incentive references the accounting side of health care through the difference between the revenues (reimbursements) and variable costs, which result in the contribution margin. Thus, the perception is the fact that the contribution margin is artificially inflated by reducing the variable costs on a per patient basis (Anthony, Hawkins, & Merchant, 2004). Under prospective payment, the reimbursement depends on the diagnosis of the patient, providers thus lost the additional capital they received for providing treatments that deviated from the principal diagnosis (Cutler, 1995).

Additionally, an inflated profit margin would be the direct result of discharging a patient earlier than average, which equates to a profit because prospective payment allows the provider to pocket any dollars above the costs of treatment. This argument suggests that patients could be discharged "quicker and sicker" (Tieman, 2003). Granted, the average length of stay dropped

roughly 3.8 days for Medicare patients as prospective payment grew, but as Gapenski (2003) suggests, no evidence exists to suggest that the decrease in length of stay equates to a sicker patient. The decrease could be due to the simple fact that there is less patient induced demand. Furthermore, as Cutler (1995) suggested, the absence of marginal reimbursements or additional capital did not influence the level of sickness of each respective patient. Prospective payment may also negatively affect initial access to care because by definition alone, prospective payment creates an incentive for health care networks to discourage admitting low-income people with clinically complex health care needs (Reynolds, 1999). Some also may argue that clinical and administrative personnel realized the strong relationship between the clinical and financial sides of health care and how every clinical decision is also a financial decision, and that every financial decision has many clinical implications (Reynolds, 1999).

Moreover, additional studies have also shown that the quality of care did not suffer as a direct result from the switch to a prospective payment scheme. One study conducted on 14,012 Medicare patients that were hospitalized from 1981 through 1982 and 1985 through 1986 demonstrated that some areas of care even improved with the change. The study researched five diseases, congestive heart failure, acute myocardial infarction, pneumonia, cerebrovascular accident, and hip fracture. The overall mean length of stay dropped from 14.4 days to 11.0 days, which equates to a 23.61% change. Furthermore, the in-hospital mortality rate declined from 16% to just under 13%, the 30-day mortality (adjusted for sickness) was 1.1% lower, and the 180-day adjusted mortality was essentially unchanged (Kahn, Keeler, Sherwood, Rogers, Draper, Bentow, Reinisch, Rubenstein, Kosecoff, & Brook, 1990). This may be due to the new focus that a resource constrained health care system may cause. In the interest of savings, providers

may be more prone to ordering the correct bout of ancillary procedures the first time and opposed to repeat any potentially unnecessary procedures.

One study did demonstrate that the introduction of a prospective payment model negatively influenced the patient care outcome. The same study even went as far as to suggest that a prospective payment environment might have even caused undue hardships on the immediate family members. The study included a sample size of 10,913 Medicare patients from the same timeframe as the study above. The investigation empirically depicted that an increase of 22% of the patients were discharged unstable. Most of this increase was due to the fact that patients were discharged home and were left under the primary responsibility of family members. Most important was the documented conclusion that 43% of the patients that were discharged home after the inception of prospective payment and were more likely to be unstable (Kosecoff, Kahn, Rogers, Reinisch, Sherwood, Rubenstein, Draper, Roth, Chew, & Brook, 1990).

The introduction of prospective payment to control outrageous spending under Medicare was a revolutionary concept, but clever clinicians and administrators alike soon realized that one could upcode a given patient's condition in order to receive a higher level of compensation. Because of this, the federal government began investigating fraudulent activity through its Office of the Inspector General, which has resulted in many health care facilities implementing corporate compliance programs. Besides watching for unethical billing practices, the compliance programs have helped organizations distribute changes in health policies, encourage employees to report concerns, and allow for an accurate view of employee behavior (Malatestinic, Braun, Jorgenson, & Eskew, 2003). It is important to note that although several pessimistic individuals do not believe in the effectiveness of Medicare, DRGs, and the

prospective approach, Australia, Germany, and France implemented similar concepts (Tieman, 2003).

Purpose

Focusing only on the cost perspective, the primary purpose of this paper is to study the CHAMPUS CMAC model as a potential prospective payment valuation platform for the MHS. To meet this primary objective, the CHAMPUS model will be disassembled into its various cost components to accurately and empirically depict what variables constitute the main formula. Additionally, the deconstruction process will provide an accurate cross-comparison of the CHAMPUS model to the CMS first mover and highlight which cost components do not apply to the MHS, and suggest which components should be incorporated. Most importantly, a budget will be derived for the top 10 DRGs for a large urban military hospital based on its officially reported historical costs from the information contained within the MHS Management and Analysis Reporting Tool (M2). Using the information from M2 as a foundation, a second analysis of historical (retrospective reimbursement) data compared to CMAC rates (prospective reimbursement) will empirically suggest whether a prospective payment process would lend itself as an effective tool to fund the patient care mission of the MHS. Simply stated, the study will provide an unbiased result as to whether or not the current historical methodology of MTF funding is superior, or whether the CMAC inpatient prospective payment model is a feasible cost savings alternative for the MHS, as Mr. Ford would posit otherwise.

Method and Procedures

The conceptual model from figure 1 represents the overarching framework that facilitated the measurement of the construct and theory of prospective payment and how the individual cost components influence the prospective payment mechanism. The model from figure 1 is derived

based on the Medicare PPS, however, it was utilized to conceptually construct the CHAMPUS configuration and serve as a baseline for cross comparisons. The study actually began with site or MTF specific information down to the DRG level for direct MTF health care and purchased health care. A graphic representation of the study design is included in figure 2.

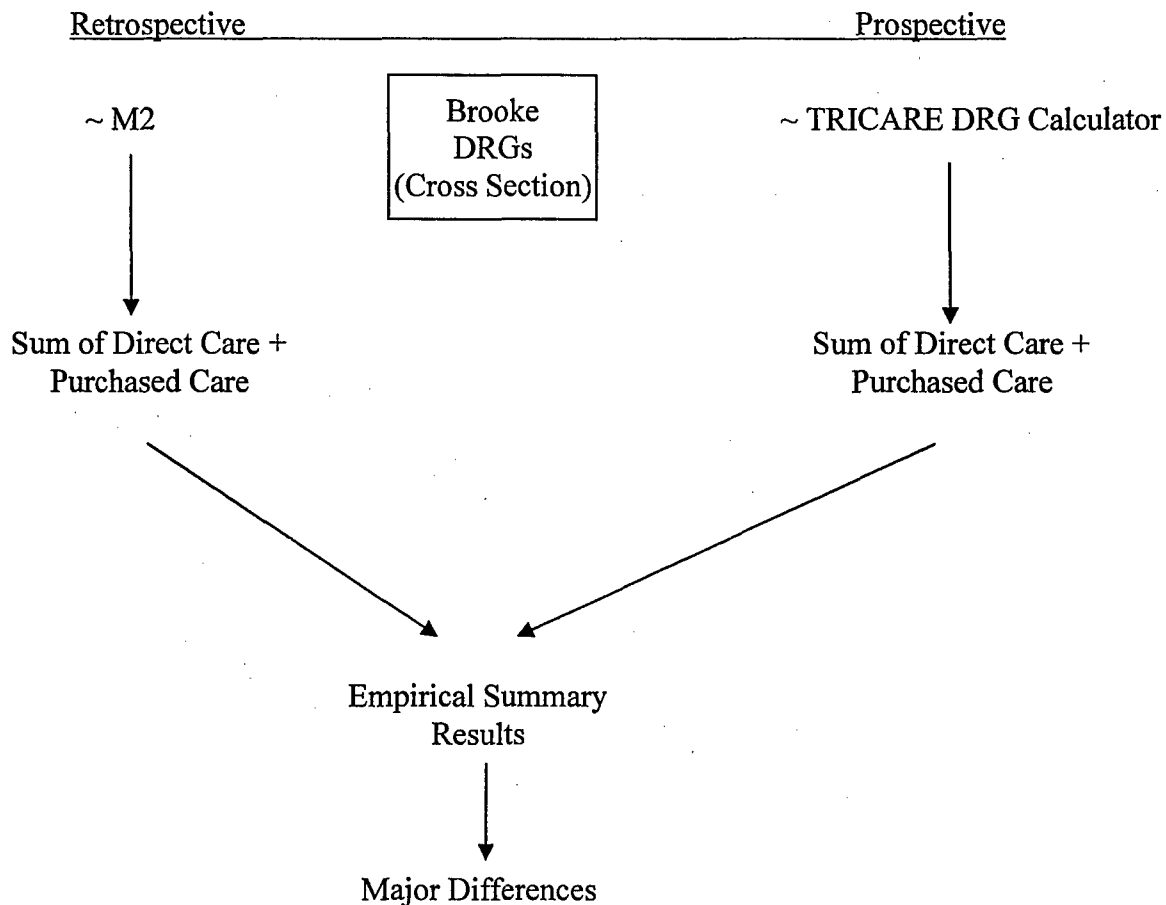


Figure 2. Graphic representation the study design.

The study included a cross-section or snapshot in time of the 10 most common (national) DRGs for the year 2002 as reported by the Federal Register (Tieman, 2003). The 10 most common DRGs are located in appendix A by DRG number and the respective descriptions.

The military health care facility that served as the case study for this analysis was Brooke Army Medical Center, a 450-bed full service medical center located in San Antonio, Texas.

Brooke as a major medical center and teaching facility was the enrollment site that DRG specific patient data were computed for based on retrospective and prospective designs (BAMC, 2002). To form a cost-focused baseline, the data were extracted from historical information located within the M2 datamart for both the direct care and purchased care elements of the MHS. The direct care references the inpatient medical care provided and costs incurred within the four walls of a given military treatment facility. The purchased care side refers to those patients and ensuing bills that were incurred outside of a military hospital. Essentially all data derived for Brooke from M2 represents the traditional historical method of a cost based budgeting approach or more formally, a retrospective payment.

All of the aggregate level data for Brooke is contained within appendix L as an executive summary. It begins with retrospective cost data as a baseline level of analysis. After the retrospective cost-based data were derived for the 10 DRGs for 2002, the total length of stay, average length of stay, range of stays, and the standard deviations were computed to represent the amount of time and resources a patient may consume for each of the 10 DRGs. For example, as depicted in appendix L, the total length of stay for DRG 127 was 330 days for the study year with an average length of stay of 5.89 days. The average length of stay was derived based on a mathematical average and an average that meets the criteria for average length of stay for the American Hospital Association, which is operationally defined as the number of inpatient days divided by the number of admissions (CDC, 2005).

As part of the baseline historical data, total costs were determined for each of the 10 DRGs from M2. Total costs were broken down into variable costs and fixed costs. Fixed costs are those costs that will remain constant for the entire fiscal year, but will decrease on average as the unit of output increases. The variable costs as a whole will change as the unit of output

changes, but the unit variable costs will not change (Anthony, Hawkins, & Merchant, 2004). Purchased care costs were also added to the direct costs in order to capture or reflect the true financial costs per DRG for Brooke. Using this information, the average direct care cost per day of care was computed from the total costs divided by the total length of stay.

To calculate the next column in appendix L, CMAC prospective value (per day), the DRG calculator was applied for each of the 10 DRGs in the study (TRICARE, 2004c). Appendices B through K represent a full empirical depiction of the CMAC calculations for the 10 DRGs that are summarized in appendix L. For example, appendix B contains the DRG calculator for DRG 127. The billed charges were carried over from appendix L as those average costs per day of care for direct care. All lengths of stay were set to a value of one day, which would eliminate the possibility of the length of stay threshold outlier. If the length of stay were increased, the prospective CMAC value would also increase in proportion. More specifically, if the length of stay were increased from one day of care to the average of five days for DRG #127, the value would go from \$2,068 to \$4,756. This equates to about a 130% increase.

The discharge statuses were also set to one, which means the patients were discharged home. The number of interns and residents was 247.5, as reported by the Executive Administrator for the Graduate Medical Education program at Brooke. The 247.5 is comprised of 47.5 interns, 157 residents, and 43 fellows (R. L. Juarez, 2004). The number of beds for Brooke was set at 450 for fiscal year 2002 (BAMC, 2002). If the number of beds was reduced from 450 to 250, the prospective CMAC value increases by only 18%, or more specifically, \$2,068 to \$2,440. As Brooke is categorized as a large urban hospital in San Antonio, Texas, the wage index was .8584 (Federal Register, 2001). Based on this information, the total payment or CMAC valuation was \$2,067.70 for DRG 127, which is also demonstrated in appendix B.

Looking at the models, CMAC versus CMS, the theoretical end state is still the same, to provide an incentive-based structure that predetermines health care costs and payments. However, some of the specific independent variables as suggested by figure 1 are not applied the same way in both models. Figure 1 represents all of the independent variables or pieces that go together to form the construct under CMS' prospective payment system. These variables include, the total payments to a hospital under Medicare PPS that can be fractioned off into a prospective element and a reasonable cost portion (Cleverly & Cameron, 2003, p. 22). The prospective side is further broken down by outlier costs, DRGs (capital and operating), disproportionate share, and indirect medical education. On the other hand, bad debts, graduate medical education, and kidney acquisition costs further divide the reasonable cost side. TRICARE does use the same wage index amount as used and established by CMS. Essentially the TRICARE and CHAMPUS DRG-based model is identical to CMS with the exception of the actual payment amounts, DRG weights, and a few of the individual procedures. The overall justification of the differences lies in the fact that the two programs are nearly mutually exclusive, and that the beneficiary populations have different needs (TRICARE/CHAMPUS Policy Manual, 1999). The Medicare population under CMS would require more extensive and potentially more costly resources while the military population is younger and healthier. Some of the DRGs, such as obstetrics and pediatric services do not really apply to the CMS structure, but definitely do apply to the CMAC model (TRICARE/CHAMPUS Policy Manual, 1999).

Some other minor areas that are unique to the CMAC platform that do not apply to CMS, such as the Geographic Adjustment Factor that does not apply to TRICARE (TRICARE, 2004d). Plus, the MHS does not receive a plus-up for disproportionate share hospitals because of a large amount of Medicare type patients (CMS, 2004). Some of the major areas of military uniqueness

fall under the umbrella of mission readiness. It is relatively difficult to split out the costs of true patient care costs from military readiness costs. Much of the readiness or wartime costs are contingency one-time funds that will not be sustained in the out-years. In addition, military pay is accounted for at different level within the federal government, plus the wages and rates that the MHS providers earn is not comparable to civilian salaries (Business Plans Prospective Payment Budgeting, 2004).

Reliability and Validity

The aggregate level of data will be considered reliable and valid for the purposes of this study. Reliability refers to reproducibility or consistency of the measurement procedure (Cooper & Schindler, 2003). The historical data obtained from M2 is considered reliable because it is an officially recognized datamart and will consistently produce the same results for a given variable. The MHS and its analysts routinely pull data from M2 for supporting information in order to make key health care decisions. The data from M2 is consistent over time and all of the treatment facilities under the MHS umbrella are able to access the information for their respective facilities or access other similar facilities to compare the same type of information. The data from M2 can also be compared to other similar databases, such as the Composite Health Care System to determine reliability. The 2002 DRG calculator is also an official tool that the analysts at the TRICARE level use to determine CMAC reimbursement rates. The costing numbers yielded by the DRG calculator are the same figures that decision makers currently use to reimburse facilities. Additionally, the MHS currently uses the CMAC costing structure as a cross comparison tool for some direct and purchased care related business case

analyses. Essentially, the numbers generated by the retrospective and prospective cost structures are repeatable and consistent across the various levels of the MHS.

The validity of the study refers to measuring what it is supposed to measure (Cooper & Schindler, 2003). If the financial information from the two models is similar in nature, it will have concurrent validity. This suggests that there may be a high correlation between the two models. Conversely, if the study ultimately determines that a prospective approach is more feasible for the MHS, then external validity applies because the results could be generalized to the overall MHS (Gordis, 2000). In addition, if the study or similar studies suggest that the proposed prospective methodology is not feasible, then that is also meaningful. This would be valid for the corporate level leaders because it would mean no major funding changes to the current business model, for the time being.

Results

Based on the data computed for the 10 DRGs in the study, a prospective payment model built on a CMAC platform is not feasible for the MHS. As empirically displayed in appendix L, the CMAC prospective value for each of the 10 DRGs was less than average costs per day. The largest and smallest percent differences were for DRG 143, chest pain, and DRG 209, major joint and limb reattachment procedures, respectively. The CMAC prospective value for DRG 143 was 76.47% less than the average cost on a daily basis while DRG 209 was only 1.14% lower. It is also interesting to note that the higher the length of stay and the higher the costs, the less of a difference between the retrospective and prospective values. For example, DRG 143 costs \$9,572 per day on the average and had an average length of stay of 2.79 days, but had a 76.47% difference between the model values. DRG 209 had an average length of stay of 6.88 days, an average cost of \$4,693, but a value difference of 1.14%. From an aggregate perspective (for the

sum of the 10 DRGs), the CMAC prospective model yielded a value of \$23,153 per day with total costs of \$46,880 per day. One other observation is that DRG 209 had the highest total direct care costs of \$2,229,363 and DRG 143 had the second highest direct care total costs of \$1,818,667.

Discussion and Interpretation of Results

The values for both the retrospective and prospective models are meaningful because they can help provide the senior level executive leadership with the requisite information to help determine the feasibility and applicability of CMAC valuation as a prospective payment platform. The retrospective costs provided a baseline level of effort for fiscal year 2002 to accurately and appropriately compare the CMAC prospective values. As previously suggested in the literature review, prospective payment is aimed at improving hospital efficiencies, providing cost containment incentives to providers, all while maintaining the quality of care. The policy level intent of prospective payment is to replace the existing level of historical, cost-based retrospective funding with a rate that is predetermined.

However, the MHS is unique and may not actually lend itself to prospective payment. As Mr. Ford predicted, the data yielded a result that suggests CMAC methodology as insufficient. From an academic perspective, the title of prospective payment suggests that it is a reimbursement mechanism for Medicare and other health insurance type agencies. This means that some hospitals and other non-military health care facilities will potentially be able to offset any losses due to prospective reimbursements. The CMS model was developed by the federal government to control overbilling and excessive reimbursement practices. CMS and the federal government are not the only external stakeholders for these respective organizations. Civilian health systems support many customers and payers to include patients that can afford to pay out-

of-pocket. The year-to-year rate changes under PPS may not keep pace with medical inflation or regular inflation for that matter.

A concern is that the construct of prospective payment under Medicare was used for reimbursement, not funding or total budget. The intent was a reimbursement methodology with cost-cutting incentives in an accrual-based system as opposed to a cash-based system, which the MHS is grounded on. The current health system has a built-in incentive to be efficient stewards of tax payer dollars and it is impossible for physicians to induce demand that would result in profitable revenues. Simply stated, CMAC rates are based on prices at which care can be purchased, not MTF costs.

Furthermore, based on some of the research, the MHS is really looking for a prospective budget, which is essentially a capitated pot of money less transfer costs. Again, the intent is to force efficiency within the MHS health care facilities, however, the MTFs would argue that they are already underfunded by as much as 10% to 15% and because of that budgeting shortfall alone, the MTFs are already striving to be efficient providers of health care to the many military beneficiaries that they serve. The MHS has no ability to offset any losses with other payment mechanisms, such as patients who pay with cash.

Thus, before the MHS can adopt any prospective models based either on the CMAC platform or some other prospective mechanism, it needs to identify the total financial requirements of truly running an MTF. For example, the MTFs are required to purchase a certain floor or amount of capital equipment each year, which is supposedly part of their core budgets, but in reality, the MTFs were never funded for this initiative. The funds are simply stripped off the top, thus causing an equal and opposite reaction (opportunity cost) elsewhere in the MTF. Furthermore, the MTFs are funding and managing civilian payroll based on budget

execution, not a programmed civilian workforce. The civilian workforce should be programmed upfront and any hire-lag that is generated from gaps in employees, then one-time purchases, such as capital equipment should be executed.

Prospective budgeting would take capital expenditures and allowances into consideration as part of the weights in each of the respective DRGs. However, the math behind prospective budgeting would not take into account the fact that the MTFs actually require a rebaselining of their respective budgets to bring them to a point where a new budgeting model could be effective. Essentially, it is not feasible to embrace a prospective payment or budgeting model from an operational definition or an empirical perspective. As depicted in the executive summary in appendix L, the prospective thought process will not even result in a break even for the MHS.

To further support this observation from a micro perspective, appendix L first summarizes the CMAC valuation, then looks at valuing an MTF budget based on CMAC and fee for service, and finally a relative weighted procedure value consideration. This appendix contains the top 10 DRGs for 2002 broken down by costs, length of stay, and relative weighted procedures for the direct MTF care and purchased care for Brooke Army Medical Center. The three different scenarios attempt to briefly and empirically analyze the discussed CMAC prospective model, and two other models proposed as potential prospective payment valuation platforms.

The first scenario of CMAC valuation looks at length of stay variables and associated standard deviations to help depict how resource intensive each of these DRGs can be. As previously mentioned, the CMAC valuation using the DRG calculator demonstrates that a prospective budget based on CMAC rates is not feasible. The second scenario of using CMAC

rates and some sensitivity analysis rates of 14% and 15% demonstrate that it takes an additional amount of capital to just equate to historical costs. This scenario attempts to apply the relative weighted procedure (RWP) concept to CMAC rates. An RWP is an average amount allowed that includes institutional and professional fees and is adjusted for local wage index.

The RWP value determined by the Office of the Assistant Secretary of Defense for Health Affairs was \$5,628 in 2004, which was discounted by 3.1% to derive a value of \$5,295 in 2002 (2004). Each of the 10 DRGs has a respective RWP weight derived and computed against the 2002 value to arrive at an value per RWP. The average value per RWP was then multiplied by 14% and 15% and added to the CMAC prospective value per day. These numbers almost equate to each of the DRG costs per day. Most noteworthy is the simple fact that these RWP values were added to the CMAC prospective value to just break even with historical costs. Appendix L also contains sensitivity analysis values for minimum and maximum RWPs.

The third scenario, RWP valuation, takes the second example one-step further. This looks at a prospective budget based solely on RWP total values. Again, the 2004 Health Affairs rate was discounted back to 2002 and applied on a total level to each of the DRGs. In all cases, the historical costs for the direct care aspect was 26.23% greater than a pure RWP value. For the 10 DRGs the total direct costs were \$11.95M and the direct RWP value was \$8.81M, which is very short of meeting minimum costs for the MHS.

Thus, all three of these models are inadequate for prospective funding for the MHS. The proposed CMAC prospective payment model highlights an overall average rate for the MHS, which is suggested to cover 85% of total expenses (Prospective Payment System Workgroup IPR, 2004). This model posits that under an MHS prospective payment scheme health care requirements will be programmed based on a value of clinical services, not necessarily the true

costs of the military mission. Conversely, if the data determined other possible results it would mean that a prospective budgeting model is feasible for the MHS, particularly the focus of this study, the CMAC platform.

Study Limitations

The study design only included a sample size of 10 DRGs for this study, which were based on the 10 most common DRGs for 2002. This number was a national number and may not have been representative of the MHS' 10 most common DRGs. Also, the 10 DRGs may not have accurately represented those DRGs that would allow health care providers and health care facilities the ability to draw a profit from those DRGs where they have developed some level of economies of scale. The way the DRG calculators were applied only included one day as the length of stay, the number of beds (450) may be too high, and the scenario assumed that patients were discharged home for self-care. These major assumptions may have negatively influenced the payment summaries. The data applied to the DRG calculators did not allow for any computations for DRG inlier payments, cost outlier payments, or any transfer payments. The CMAC and fee-for-service and RWP valuation models contained in appendix L were also developed on RWPs added to a pure CMAC valuation. Some of the studies within the MHS currently include some studies that add 10% plus of the CMAC prospective value, not the value based on RWPs. This study attempted to further validate the fact that the CMAC prospective valuation alone was not sufficient, even to meet retrospective budgeting numbers.

Conclusion and Recommendations

As the MHS evolved from T-NOW to T-NEX and Health Affairs desired to realize a \$3.3B savings over several fiscal years, Mr. Nelson Ford charged the three services with analyzing the CHAMPUS CMAC model as a prospective payment platform for the MHS

compared to the current historical charge-based model. The purpose of this study was two-fold. The first was to disassemble the CHAMPUS model into its various costs components in order to empirically assess which methodology of funding was superior. The second purpose was a natural follow-on from the first; suggest whether a prospective payment process would lend itself as an effective tool to fund the patient care mission of the MHS and if not, suggest some probable solutions.

Based on the data provided by this study, the CMAC prospective valuation was less than the historical baseline level of effort, thus is not recommended that the MHS pursue a prospective method of budgeting at this time. The MHS needs to first identify its true and total financial requirement of providing health care services to its beneficiary populations. After the true and total financial requirement is identified, it is further recommended that the MTFs be rebaselined with the requisite capital to properly run each of the MHS facilities from clinical and administrative perspectives.

Additionally, a cost comparison study should be conducted to empirically depict whether or not the MHS' method of providing care is comparable to that of the civilian health care system. If the costing structures are similar, then the MHS may be able to entertain the idea of investing the time and resources in a prospective budgeting methodology. Trying to capture current costs may not be entirely accurate because most MTFs have been making strategic budget cuts over the last several years because the overall MTF budget was not keeping pace with medical inflationary costs. Prospective payment programs are in a sense, a capitated reimbursement concept for longer-term or inpatient care. As Reynolds (1999) suggested, PPS was initiated to reduce the federal government's long-term care costs and obligations while trying to curb providers from inducing their own respective patient care demand.

References

- Baker, J. (2002). Medicare payment system for hospital inpatients: Diagnosis-related groups. *Journal of Health Care Finance: 28*(3), 76-87.
- Business Plans Prospective Payment Budgeting: 2004* [Powerpoint briefing].
- BAMC. (2002). Brooke army medical center departments – Transitional year program. Retrieved August 23, 2004, from <http://www.bamc.army.mil/typ.htm>
- CBO. (1983). CHAMPUS and prospective reimbursement. Retrieved July 23, 2004, from <http://www.cbo.gov/showdoc.cfm?index=5031&sequence=0>
- CDC. (2005). NCHS definitions: Average length of stay. Retrieved May 20, 2005, from <http://www.cdc.gov/nchs/datawh/nchsdefs/averagelengthofstay>
- Cleverly, W. O., & Cameron, A. E. (2003). *Essentials of health care finance* (5th ed.). Sudbury, MA: Jones and Bartlett.
- Cooper, D. R., & Schindler, P. S. (2003). *Business research methods* (8th ed.). New York, NY: McGraw-Hill.
- Cutler, D. M. (1995). The incidence of adverse medical outcomes under prospective payment. *Econometrica: 63*, 29-50.
- Decision Support Center. (2004). Business plan overview. Retrieved July 23, 2004, from <https://ke2.army.mil/otsg/main.php?cid=57&wspace=7&wid=1671>
- Durthaler, J., & Miller, A. (2003). Hospital inpatient prospective payment system: Incorporating new technology. *American Journal of Health-System Pharmacists: 60*(6), S15-S20.

Federal Register. (2001). TRICARE management activity; Fiscal year 2002 diagnosis related group (DRG) updates. Retrieved August 5, 2004, from

[http://www.frwebgate.access.gpo.gov/cgi-](http://www.frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2001_register&docid=01-3109)

[bin/getdoc.cgi?dbname=2001_register&docid=01-3109](http://www.frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2001_register&docid=01-3109)

Gapenski, L. C. (2003). *Understanding healthcare financial management* (4th ed.).

Washington, DC: AUPHA/HAP

Ginter, P. M., Swayne, L. E., & Duncan, W. J. (2002). *Strategic management of health care organizations* (4th ed.). Malden, MA: Blackwell.

Gordis, L. (2000). *Epidemiology* (2nd ed). Philadelphia, PA: Saunders.

Grimaldi, P. L. (2002). Medicare's fee schedule for hospital outpatient care. *Journal of Health Care Finance*: 28(3), 14-31.

Health Net Federal Services. (2005). TRICARE rates. Retrieved May 18, 2005, from

<http://www.hnfs.net/provider/claims/chargeRates/Allowable+Charge+Review.htm>

Henderson, J. W. (2002). *Health economics and policy* (2nd ed.). Mason, OH: South-Western.

Implementation of Prospective Payment System: 2004 [Powerpoint briefing].

IRP. (1994). Refinement of the medicare diagnosis-related groups to incorporate a measure of severity. Retrieved May 18, 2005, from <http://www.irp.com/srdrgr.htm>

Kahn, K., Keeler, E., Sherwood, M., Rogers, W., Draper, D., Bentow, S., Reinisch, E., &

Rubenstein, L. (1990). Comparing outcomes of care before and after implementation of the DRG-based prospective payment system. *Journal of the American Medical*

Association: 264 (15), 1984-1987.

Kaplan, R., & Norton, D. (1996). *The balanced scorecard*. City, MA: Harvard Business School.

- Kosecoff, J., Kahn, K., Rogers, W., Reinisch, E., Sherwood, M., Rubenstein, L., Draper, D., Roth, C., Chew, C., & Brook, R. (1990). Prospective payment system and impairment at discharge: The quicker-and-sicker story revisited. *Journal of the American Medical Association*: 264 (15), 1980-1983.
- Malatestinic, W., Braun, L., Jorgenson, J., & Eskew, J. (2003). Components of medicare reimbursement. *American Journal of Health-System Pharmacists*: 60(6), S3-S7.
- Market Management in a Revised Financing Environment*: 2004 [Powerpoint briefing].
- Meltzer, D., Chung, J., & Basu, A. (2002). Does competition under medicare prospective payment selectively reduce expenditures on high-cost patients? *RAND Journal of Economics*: 33(3), 447-468.
- Military Health System Business Planning – A Leadership Perspective*: 2004 [Word document].
- Prospective Payment System Workgroup IPR*: 2004 [Powerpoint briefing].
- R. L. Juarez (personal communication, August 10, 2004)
- Reynolds, D. F., (1999). Medicare prospective payment – The ethical implications of converging clinical and financial decisions in long-term care. *Bioethics Forum*: 15(3), 29-34.
- RPC. (2004). RPC research & planning consultants. Retrieved May 16, 2005, from <http://www.rpcconsulting.com/hipps.htm>
- Shi, L., & Singh, D. A. (2001). *Delivering health care in America: A systems approach* (2nd ed.). Gaithersburg, MD: Aspen.
- Tieman, J. (2003). It was 20 years ago today. *Modern Healthcare*: 33(39), 6-7, 25-28.
- TRICARE Rates. (2005). CHAMPUS maximum allowable charge. Retrieved May 18, 2005, from <http://www.hnfs.net/provider/claims.chargeRates/Allowable+Charge+Review.htm>

TRICARE. (2004a). TRICARE next generation of contracts. Retrieved August 10, 2004, from

http://www.tricare.osd.mil/pmo/t-nex/marketing_education.cfm

TRICARE. (2004b). TRICARE new contracts and me.

Retrieved August 10, 2004, from

<http://www.tricare.osd.mil/contractsimplementation/default.cfm>

TRICARE. (2004c). Calculation of DRG payment. Retrieved August 4, 2004, from

<http://www.tricare.osd.mil/drgrates/index.cfm?fuseaction=drgPaymentCalculator.drgPaymentInfo>

TRICARE. (2004d). Wage indexes for urban and rural areas for reclassified hospitals. Retrieved

August 4, 2004, from

<http://www.tricare.osd.mil/drgrates/index.cfm?fuseaction=wageIndexex&fiscal>

TRICARE Governance Plan: 2004 [Powerpoint briefing].

TRICARE. (2002). Next generation of TRICARE contracts. Retrieved August 10, 2004, from

<http://www.tricare.osd.mil/Factsheets/viewfactsheet.cfm?id=185>

TRICARE/CHAMPUS Policy Manual 6010.47-M: 1999 [PDF document].

Appendix A

10 Most Common DRGs in 2002

<u>DRG</u>		<u>Description</u>
	<u>#</u>	
1	127	Heart failure and shock
2	89	Simple pneumonia and pleurisy, with comorbidities and complications (CC)
3	88	Chronic obstructive pulmonary disease
4	209	Major joint and limb reattachment procedures
5	296	Nutritional and miscellaneous metabolic disorders, with CC
6	182	Esophagitis, gastroenterological and miscellaneous digestive disorders
7	174	Gastrointestinal hemorrhage with CC
8	143	Chest pain
9	14	Intracranial hemorrhage and stroke with infarct
10	138	Cardiac arrhythmia and conduction disorders with CC

Appendix B

Claim Information			
Input		Output	
Billed Charges	\$ 4,533.47	DRG Weight	1.0978
LOS	1.00	Geometric Mean	3.5
DRG	127	Arithmetic Mean	4.6
Discharge Status	01	Short LOS Threshold	1
		Transfer Flag	0
Hospital Specific Information			
Input		Output	
# Intems & Residents	247.5	I-R Ratio	0.5500
# of Beds	450	IDME Factor	0.3498
IDME Factor (override)	0.0000	Wage Adjusted ASA	\$ 3,209.28
Wage Index	0.8584	Cost Outlier Threshold	\$ 20,628.28
Large Urban?	<input checked="" type="checkbox"/>		
Children's Hospital?	<input type="checkbox"/>		
HEART FAILURE & SHOCK			
Payment Summary			
DRG Inlier Payment			\$ -
Short Stay Outlier Payment			\$ 2,067.70
Cost Outlier Payment			\$ -
Transfer Payment			\$ -
Total Payment			\$ 2,067.70

Payment Details	
Wage Adjusted ASA	= [ASA*Labor Portion*Wage Index+ASA* Non-Labor Portion] = [\$3,568.55*0.711+\$3,568.55*0.289] = \$3,209.28 = \$ 3,209.28
Inlier DRG payment	= DRG Weight*Wage Adjusted ASA = 1.0978*\$3,209.28 = \$ 3,523.14
IDME Adjusted Inlier DRG Payment	= Inlier DRG Payment*(1+IDME Factor) = \$3,523.14*(1+0.3498) = \$ 4,755.71
Short LOS Outlier Payment	= minimum of [2*LOS*(Inlier DRG Payment/Arithmetic Mean LOS) OR Inlier DRG Payment]*(1+IDME Factor) = minimum of [2*1*(\$3,523.14/4.6) OR \$3,523.14]*(1+0.3498) = \$ 2,067.70
Per diem (for use with transfers only)	= Inlier DRG Payment/Geometric Mean = \$3,523.14/3.5 = \$ 1,006.61
Cost Outlier threshold	= Inlier DRG payment*(1+IDME Factor)+Fixed Loss Threshold*(Labor Portion*Wage Index+Non-Labor Portion)*NOSCAASOTC = \$3,523.14*(1+0.3498)+\$19,226.00*(0.711*0.8584+0.289*0.918) = \$ 20,628.28
Transfer Adjusted Cost Outlier Threshold (No Transfer Adjustment)	= Cost Outlier Threshold*1 = \$20,628.28*1 = \$ 20,628.28
Cost Outlier payment	= (Billed Charges*Cost-to-charge Ratio-Transfer Adjusted Cost Outlier Threshold)*Marginal Cost Factor = (\$4,533.47*0.5073-\$20,628.28)*0.8 = \$ -
DRG payment (Short LOS Outlier)	= Inlier DRG payment*(1+IDME Factor) = \$3,523.14*(1+0.3498) = \$ -

Appendix C

Claim Information			
Input		Output	
Billed Charges	\$ 4,065.52	DRG Weight	1.0883
LOS	1	Geometric Mean	4.1
DRG	89	Arithmetic Mean	4.9
Discharge Status	01	Short LOS Threshold	1
		Transfer Flag	0
Hospital Specific Information			
Input		Output	
# Interns & Residents	247.5	I-R Ratio	0.5500
# of Beds	450	IDME Factor	0.3498
IDME Factor (override)	0.0000	Wage Adjusted ASA	\$ 3,209.28
Wage Index	0.8584	Cost Outlier Threshold	\$ 20,587.12
Large Urban?	<input checked="" type="checkbox"/>		
Children's Hospital?	<input type="checkbox"/>		
SIMPLE PNEUMONIA & PLEURISY AGE > 17 W CC			

FY 2002 Policy Information	
ASA	\$ 3,568.55
Labor Portion	71.10%
Non-Labor Portion	28.90%
Fixed Loss Threshold	\$ 19,226.00
Cost-to-charge Ratio	0.5073
Marginal Cost Factor	0.80
NOSCAASOTC	0.9180
Children's Hospital Differential	\$ -
Children's Hospital Outlier Adjustment Factor	0.00
Payment Summary	
DRG Inlier Payment	\$ -
Short Stay Outlier Payment	\$ 1,924.31
Cost Outlier Payment	\$ -
Transfer Payment	\$ -
Total Payment	\$ 1,924.31

Payment Details	
Wage Adjusted ASA	$= [ASA * Labor Portion * Wage Index + ASA * Non-Labor Portion]$ $= [\$3,568.55 * 0.711 + \$3,568.55 * 0.289]$ $= \$3,209.28$
Inlier DRG payment	$= DRG Weight * Wage Adjusted ASA$ $= 1.0883 * \$3,209.28$ $= \$ 3,492.66$
IDME Adjusted Inlier DRG Payment	$= Inlier DRG Payment * (1 + IDME Factor)$ $= \$3,492.66 * (1 + 0.3498)$ $= \$ 4,714.56$
Short LOS Outlier Payment	$= \text{minimum of } [2 * LOS * (Inlier DRG Payment / Arithmetic Mean LOS) \text{ OR } Inlier DRG Payment] * (1 + IDME Factor)$ $= \text{minimum of } [2 * 1 * (\$3,492.66 / 4.9) \text{ OR } \$3,492.66] * (1 + 0.3498)$ $= \$ 1,924.31$
Per diem (for use with transfers only)	$= Inlier DRG Payment / Geometric Mean$ $= \$3,492.66 / 4.1$ $= \$ 851.87$
Cost Outlier threshold	$= Inlier DRG payment * (1 + IDME Factor) + Fixed Loss Threshold * (Labor Portion * Wage Index + Non-Labor Portion) * NOSCAASOTC$ $= \$3,492.66 * (1 + 0.3498) + \$19,226.00 * (0.711 * 0.8584 + 0.289 * 0.918)$ $= \$ 20,587.12$
Transfer Adjusted Cost Outlier Threshold (No Transfer Adjustment)	$= Cost Outlier Threshold * 1$ $= \$20,587.12 * 1$ $= \$ 20,587.12$
Cost Outlier payment	$= (Billed Charges * Cost-to-charge Ratio - Transfer Adjusted Cost Outlier Threshold) * Marginal Cost Factor$ $= (\$4,065.52 * 0.5073 - \$20,587.12) * 0.8$ $= \$ -$
DRG payment (Short LOS Outlier)	$= Inlier DRG payment * (1 + IDME Factor)$ $= \$3,492.66 * (1 + 0.3498)$ $= \$ -$

Appendix D

Claim Information				FY 2002 Policy Information			
Input		Output		ASA			
Billed Charges	\$ 5,378.75	DRG Weight	0.9276	ASA		\$ 3,568.55	
LOS	1	Geometric Mean	3.6	Labor Portion		71.10%	
DRG	88	Arithmetic Mean	4.5	Non-Labor Portion		28.90%	
Discharge Status	01	Short LOS Threshold	1	Fixed Loss Threshold		\$ 19,226.00	
		Transfer Flag	0	Cost-to-charge Ratio		0.5073	
Hospital Specific Information				Marginal Cost Factor		0.80	
Input		Output		NOSCAASOTC		0.9180	
# Intens & Residents	247.5	I-R Ratio	0.5500	Children's Hospital Differential		\$ -	
# of Beds	450	IDME Factor	0.3498	Children's Hospital Outlier Adjustment Factor		0.00	
IDME Factor (override)	0.0000	Wage Adjusted ASA	\$ 3,209.28	Payment Summary			
Wage Index	0.8584	Cost Outlier Threshold	\$ 19,890.96	DRG Inlier Payment		\$ -	
Large Urban?	<input checked="" type="checkbox"/>			Short Stay Outlier Payment		\$ 1,785.96	
Children's Hospital?	<input type="checkbox"/>			Cost Outlier Payment		\$ -	
CHRONIC OBSTRUCTIVE PULMONARY DISEASE				Transfer Payment		\$ -	
				Total Payment		\$ 1,785.96	
Payment Details							
Wage Adjusted ASA	= [ASA*Labor Portion*Wage Index+ASA* Non-Labor Portion]						
	= [\$3,568.55*0.711+0.8584*\$3,568.55*0.289]						
	= \$3,209.28						
	= \$ 3,209.28						
Inlier DRG payment	= DRG Weight*Wage Adjusted ASA						
	= 0.9276*\$3,209.28						
	= \$ 2,976.93						
IDME Adjusted Inlier DRG Payment	= Inlier DRG Payment*(1+IDME Factor)						
	= \$2,976.93*(1+0.3498)						
	\$ 4,018.40						
Short LOS Outlier Payment	= minimum of [2*LOS*(Inlier DRG Payment/Arithmetic Mean LOS) OR Inlier DRG Payment]*(1+IDME Factor)						
	= minimum of [2*1*(\$2,976.93/4.5) OR \$2,976.93]*(1+0.3498)						
	\$ 1,785.96						
Per diem (for use with transfers only)	= Inlier DRG Payment/Geometric Mean						
	= \$2,976.93/3.6						
	\$ 826.92						
Cost Outlier threshold	= Inlier DRG payment*(1+IDME Factor)+Fixed Loss Threshold*(Labor Portion*Wage Index+Non-Labor Portion)*NOSCAASOTC						
	= \$2,976.93*(1+0.3498)+\$19,226.00*(0.711*0.8584+0.289)*0.918						
	\$ 19,890.96						
Transfer Adjusted Cost Outlier Threshold (No Transfer Adjustment)	= Cost Outlier Threshold*1						
	= \$19,890.96*1						
	\$ 19,890.96						
Cost Outlier payment	= (Billed Charges*Cost-to-charge Ratio-Transfer Adjusted Cost Outlier Threshold)*Marginal Cost Factor						
	= (\$5,378.75*0.5073-\$19,890.96)*0.8						
	\$ -						
DRG payment (Short LOS Outlier)	= Inlier DRG payment*(1+IDME Factor)						
	= \$2,976.93*(1+0.3498)						
	\$ -						

Appendix E

Claim Information			
Input		Output	
Billed Charges	\$ 4,693.40	DRG Weight	2.3564
LOS	1	Geometric Mean	4.1
DRG	209	Arithmetic Mean	4.4
Discharge Status	01	Short LOS Threshold	1
		Transfer Flag	0
Hospital Specific Information			
Input		Output	
# Intems & Residents	247.6	I-R Ratio	0.5500
# of Beds	450	IDME Factor	0.3498
IDME Factor (override)	0.0000	Wage Adjusted ASA	\$ 3,209.28
Wage Index	0.8584	Cost Outlier Threshold	\$ 26,080.58
Large Urban?	<input checked="" type="checkbox"/>		
Children's Hospital?	<input type="checkbox"/>		
MAJOR JOINT & LIMB REATTACHMENT PROCEDURES OF LOWER EXTREMITY			

FY 2002 Policy Information	
ASA	\$ 3,568.55
Labor Portion	71.10%
Non-Labor Portion	28.90%
Fixed Loss Threshold	\$ 19,226.00
Cost-to-charge Ratio	0.5073
Marginal Cost Factor	0.80
NOSCAASOTC	0.9180
Children's Hospital Differential	\$ -
Children's Hospital Outlier Adjustment Factor	0.00
Payment Summary	
DRG Inlier Payment	\$ -
Short Stay Outlier Payment	\$ 4,640.01
Cost Outlier Payment	\$ -
Transfer Payment	\$ -
Total Payment	\$ 4,640.01

Payment Details	
Wage Adjusted ASA	$= [ASA * Labor Portion * Wage Index + ASA * Non-Labor Portion]$ $= [\$3,568.55 * 0.711 + \$3,568.55 * 0.289]$ $= \$3,209.28$ $= \$ 3,209.28$
Inlier DRG payment	$= DRG Weight * Wage Adjusted ASA$ $= 2.3564 * \$3,209.28$ $= \$ 7,562.34$
IDME Adjusted Inlier DRG Payment	$= Inlier DRG Payment * (1 + IDME Factor)$ $= \$7,562.34 * (1 + 0.3498)$ $= \$ 10,208.02$
Short LOS Outlier Payment	$= \text{minimum of } [2 * LOS * (Inlier DRG Payment / Arithmetic Mean LOS) \text{ OR } Inlier DRG Payment] * (1 + IDME Factor)$ $= \text{minimum of } [2 * 1 * (\$7,562.34 / 4.4) \text{ OR } \$7,562.34] * (1 + 0.3498)$ $= \$ 4,640.01$
Per diem (for use with transfers only)	$= Inlier DRG Payment / Geometric Mean$ $= \$7,562.34 / 4.1$ $= \$ 1,844.47$
Cost Outlier threshold	$= Inlier DRG payment * (1 + IDME Factor) + Fixed Loss Threshold * (Labor Portion * Wage Index + Non-Labor Portion) * NOSCAASOTC$ $= \$7,562.34 * (1 + 0.3498) + \$19,226.00 * (0.711 * 0.8584 + 0.289 * 0.918)$ $= \$ 26,080.58$
Transfer Adjusted Cost Outlier Threshold (No Transfer Adjustment)	$= Cost Outlier Threshold * 1$ $= \$26,080.58 * 1$ $= \$ 26,080.58$
Cost Outlier payment	$= (Billed Charges * Cost-to-charge Ratio - Transfer Adjusted Cost Outlier Threshold) * Marginal Cost Factor$ $= (\$4,693.40 * 0.5073 - \$26,080.58) * 0.8$ $= \$ -$
DRG payment (Short LOS Outlier)	$= Inlier DRG payment * (1 + IDME Factor)$ $= \$7,562.34 * (1 + 0.3498)$ $= \$ -$

Appendix F

Claim Information			
Input		Output	
Billed Charges	\$ 3,829.75	DRG Weight	0.9777
LOS	1	Geometric Mean	3.3
DRG	298	Arithmetic Mean	4.5
Discharge Status	01	Short LOS Threshold	1
		Transfer Flag	0
Hospital Specific Information			
Input		Output	
# Intems & Residents	247.5	I-R Ratio	0.5500
# of Beds	450	IDME Factor	0.3498
IDME Factor (override)	0.0000	Wage Adjusted ASA	\$ 3,209.28
Wage Index	0.8584	Cost Outlier Threshold	\$ 20,108.00
Large Urban?	<input checked="" type="checkbox"/>		
Children's Hospital?	<input type="checkbox"/>		
NUTRITIONAL & MISC METABOLIC DISORDERS AGE >17 W CC			

FY 2002 Policy Information	
ASA	\$ 3,568.55
Labor Portion	71.10%
Non-Labor Portion	28.90%
Fixed Loss Threshold	\$ 19,228.00
Cost-to-charge Ratio	0.5073
Marginal Cost Factor	0.80
NOSCAASOTC	0.9180
Children's Hospital Differential	\$ -
Children's Hospital Outlier Adjustment Factor	0.00
Payment Summary	
DRG Inlier Payment	\$ -
Short Stay Outlier Payment	\$ 1,882.42
Cost Outlier Payment	\$ -
Transfer Payment	\$ -
Total Payment	\$ 1,882.42

Payment Details	
Wage Adjusted ASA	$= [ASA * Labor Portion * Wage Index + ASA * Non-Labor Portion]$ $= [\$3,568.55 * 0.711 + 0.8584 * \$3,568.55 * 0.289]$ $= \$3,209.28$ $= \$ 3,209.28$
Inlier DRG payment	$= DRG Weight * Wage Adjusted ASA$ $= 0.9777 * \$3,209.28$ $= \$ 3,137.71$
IDME Adjusted Inlier DRG Payment	$= Inlier DRG Payment * (1 + IDME Factor)$ $= \$3,137.71 * (1 + 0.3498)$ $= \$ 4,235.44$
Short LOS Outlier Payment	$= \text{minimum of } [2 * LOS * (Inlier DRG Payment / Arithmetic Mean LOS) \text{ OR } Inlier DRG Payment] * (1 + IDME Factor)$ $= \text{minimum of } [2 * 1 * (\$3,137.71 / 4.5) \text{ OR } \$3,137.71] * (1 + 0.3498)$ $= \$ 1,882.42$
Per diem (for use with transfers only)	$= Inlier DRG Payment / Geometric Mean$ $= \$3,137.71 / 3.3$ $= \$ 950.82$
Cost Outlier threshold	$= Inlier DRG payment * (1 + IDME Factor) + Fixed Loss Threshold * (Labor Portion * Wage Index + Non-Labor Portion) * NOSCAASOTC$ $= \$3,137.71 * (1 + 0.3498) + \$19,228.00 * (0.711 * 0.8584 + 0.289 * 0.918)$ $= \$ 20,108.00$
Transfer Adjusted Cost Outlier Threshold (No Transfer Adjustment)	$= Cost Outlier Threshold * 1$ $= \$20,108.00 * 1$ $= \$ 20,108.00$
Cost Outlier payment	$= (Billed Charges * Cost-to-charge Ratio - Transfer Adjusted Cost Outlier Threshold) * Marginal Cost Factor$ $= (\$3,829.75 * 0.5073 - \$20,108.00) * 0.8$ $= \$ -$
DRG payment (Short LOS Outlier)	$= Inlier DRG payment * (1 + IDME Factor)$ $= \$3,137.71 * (1 + 0.3498)$ $= \$ -$

Appendix G

Claim Information			
Input		Output	
Billed Charges	\$ 2,867.36	DRG Weight	0.7792
LOS	1.00	Geometric Mean	2.7
DRG	182	Arithmetic Mean	3.5
Discharge Status	01	Short LOS Threshold	1
		Transfer Flag	0
Hospital Specific Information			
Input		Output	
# Intens & Residents	247.5	I-R Ratio	0.5500
# of Beds	450	IDME Factor	0.3498
IDME Factor (override)	0.0000	Wage Adjusted ASA	\$ 3,209.28
Wage Index	0.8584	Cost Outlier Threshold	\$ 19,248.09
Large Urban?	<input checked="" type="checkbox"/>		
Children's Hospital?	<input type="checkbox"/>		
ESOPHAGITIS, GASTROENT & MISC DIGEST DISORDERS AGE >17 W CC			

FY 2002 Policy Information	
ASA	\$ 3,568.55
Labor Portion	71.10%
Non-Labor Portion	28.90%
Fixed Loss Threshold	\$ 19,226.00
Cost-to-charge Ratio	0.5073
Marginal Cost Factor	0.80
NOSCAASOTC	0.9180
Children's Hospital Differential	\$ -
Children's Hospital Outlier Adjustment Factor	0.00
Payment Summary	
DRG Inlier Payment	\$ -
Short Stay Outlier Payment	\$ 1,928.87
Cost Outlier Payment	\$ -
Transfer Payment	\$ -
Total Payment	\$ 1,928.87

Payment Details	
Wage Adjusted ASA	= [ASA*Labor Portion*Wage Index+ASA* Non-Labor Portion] = [\$3,568.55*0.711+\$3,568.55*0.289] = \$3,209.28 = \$ 3,209.28
Inlier DRG payment	= DRG Weight*Wage Adjusted ASA = 0.7792*\$3,209.28 = \$ 2,500.67
IDME Adjusted Inlier DRG Payment	= Inlier DRG Payment*(1+IDME Factor) = \$2,500.67*(1+0.3498) = \$ 3,375.53
Short LOS Outlier Payment	= minimum of [2*LOS*(Inlier DRG Payment/Arithmetic Mean LOS) OR Inlier DRG Payment]*(1+IDME Factor) = minimum of [2*1*(\$2,500.67/3.5) OR \$2,500.67]*(1+0.3498) = \$ 1,928.87
Per diem (for use with transfers only)	= Inlier DRG Payment/Geometric Mean = \$2,500.67/2.7 = \$ 926.17
Cost Outlier threshold	= Inlier DRG payment*(1+IDME Factor)+Fixed Loss Threshold*(Labor Portion*Wage index+Non-Labor Portion)*NOSCAASOTC = \$2,500.67*(1+0.3498)+\$19,226.00*(0.711*0.8584+0.289)*0.918 = \$ 19,248.09
Transfer Adjusted Cost Outlier Threshold (No Transfer Adjustment)	= Cost Outlier Threshold*1 = \$19,248.09*1 = \$ 19,248.09
Cost Outlier payment	= (Billed Charges*Cost-to-charge Ratio-Transfer Adjusted Cost Outlier Threshold)*Marginal Cost Factor = (\$2,867.36*0.5073-\$19,248.09)*0.8 = \$ -
DRG payment (Short LOS Outlier)	= Inlier DRG payment*(1+IDME Factor) = \$2,500.67*(1+0.3498) = \$ -

Appendix H

Claim Information			
Input		Output	
Billed Charges	\$ 4,037.99	DRG Weight	0.9935
LOS	1	Geometric Mean	3.1
DRG	174	Arithmetic Mean	3.8
Discharge Status	01	Short LOS Threshold	1
		Transfer Flag	0
Hospital Specific Information			
Input		Output	
# Interns & Residents	247.5	I-R Ratio	0.5500
# of Beds	450	IDME Factor	0.3498
IDME Factor (override)	0.0000	Wage Adjusted ASA	\$ 3,209.28
Wage Index	0.8584	Cost Outlier Threshold	\$ 20,176.44
Large Urban?	<input checked="" type="checkbox"/>		
Children's Hospital?	<input type="checkbox"/>		
G.I. HEMORRHAGE W CC			

FY 2002 Policy Information	
ASA	\$ 3,568.55
Labor Portion	71.10%
Non-Labor Portion	28.90%
Fixed Loss Threshold	\$ 19,226.00
Cost-to-charge Ratio	0.5073
Marginal Cost Factor	0.80
NOSCAASOTC	0.9180
Children's Hospital Differential	\$ -
Children's Hospital Outlier Adjustment Factor	0.00
Payment Summary	
DRG Inlier Payment	\$ -
Short Stay Outlier Payment	\$ 2,265.20
Cost Outlier Payment	\$ -
Transfer Payment	\$ -
Total Payment	\$ 2,265.20

Payment Details	
Wage Adjusted ASA	$= [ASA * Labor Portion * Wage Index + ASA * Non-Labor Portion]$ $= [\$3,568.55 * 0.711 + \$3,568.55 * 0.289]$ $= \$3,209.28$ $= \$ 3,209.28$
Inlier DRG payment	$= DRG Weight * Wage Adjusted ASA$ $= 0.9935 * \$3,209.28$ $= \$ 3,188.42$
IDME Adjusted Inlier DRG Payment	$= Inlier DRG Payment * (1 + IDME Factor)$ $= \$3,188.42 * (1 + 0.3498)$ $= \$ 4,303.88$
Short LOS Outlier Payment	$= \text{minimum of } [2 * LOS * (Inlier DRG Payment / Arithmetic Mean LOS) \text{ OR } Inlier DRG Payment] * (1 + IDME Factor)$ $= \text{minimum of } [2 * 1 * (\$3,188.42 / 3.8) \text{ OR } \$3,188.42] * (1 + 0.3498)$ $= \$ 2,265.20$
Per diem (for use with transfers only)	$= Inlier DRG Payment / Geometric Mean$ $= \$3,188.42 / 3.1$ $= \$ 1,028.52$
Cost Outlier threshold	$= Inlier DRG payment * (1 + IDME Factor) + Fixed Loss Threshold * (Labor Portion * Wage Index + Non-Labor Portion) * NOSCAASOTC$ $= \$3,188.42 * (1 + 0.3498) + \$19,226.00 * (0.711 * 0.8584 + 0.289) * 0.918$ $= \$ 20,176.44$
Transfer Adjusted Cost Outlier Threshold (No Transfer Adjustment)	$= Cost Outlier Threshold * 1$ $= \$20,176.44 * 1$ $= \$ 20,176.44$
Cost Outlier payment	$= (Billed Charges * Cost-to-charge Ratio - Transfer Adjusted Cost Outlier Threshold) * Marginal Cost Factor$ $= (\$4,037.99 * 0.5073 - \$20,176.44) * 0.8$ $= \$ -$
DRG payment (Short LOS Outlier)	$= Inlier DRG payment * (1 + IDME Factor)$ $= \$3,188.42 * (1 + 0.3498)$ $= \$ -$

Appendix I

Claim Information			
Input		Output	
Billed Charges	\$ 9,571.93	DRG Weight	0.5199
LOS	1	Geometric Mean	1.4
DRG	143	Arithmetic Mean	1.6
Discharge Status	01	Short LOS Threshold	1
		Transfer Flag	0
Hospital Specific Information			
Input		Output	
# Intems & Residents	247.5	I-R Ratio	0.5500
# of Beds	450	IDME Factor	0.3498
IDME Factor (override)	0.0000	Wage Adjusted ASA	\$ 3,209.28
Wage Index	0.8584	Cost Outlier Threshold	\$ 18,124.79
Large Urban?	<input checked="" type="checkbox"/>		
Children's Hospital?	<input type="checkbox"/>		
CHEST PAIN			

FY 2002 Policy Information	
ASA	\$ 3,568.55
Labor Portion	71.10%
Non-Labor Portion	28.90%
Fixed Loss Threshold	\$ 19,226.00
Cost-to-charge Ratio	0.5073
Marginal Cost Factor	0.80
NOSCAASOTC	0.9180
Children's Hospital Differential	\$ -
Children's Hospital Outlier Adjustment Factor	0.00
Payment Summary	
DRG Inlier Payment	\$ -
Short Stay Outlier Payment	\$ 2,252.23
Cost Outlier Payment	\$ -
Transfer Payment	\$ -
Total Payment	\$ 2,252.23

Payment Details	
Wage Adjusted ASA	= $[\text{ASA} \times \text{Labor Portion} \times \text{Wage Index} + \text{ASA} \times \text{Non-Labor Portion}]$ = $[\$3,568.55 \times 0.711 + \$3,568.55 \times 0.289]$ = \$3,209.28 = \$ 3,209.28
Inlier DRG payment	= $\text{DRG Weight} \times \text{Wage Adjusted ASA}$ = $0.5199 \times \$3,209.28$ = \$ 1,668.50
IDME Adjusted Inlier DRG Payment	= $\text{Inlier DRG Payment} \times (1 + \text{IDME Factor})$ = $\$1,668.50 \times (1 + 0.3498)$ = \$ 2,252.23
Short LOS Outlier Payment	= minimum of $[2 \times \text{LOS} \times (\text{Inlier DRG Payment} / \text{Arithmetic Mean LOS}) \text{ OR } \text{Inlier DRG Payment}] \times (1 + \text{IDME Factor})$ = minimum of $[2 \times 1 \times (\$1,668.50 / 1.6) \text{ OR } \$1,668.50] \times (1 + 0.3498)$ = \$ 2,252.23
Per diem (for use with transfers only)	= $\text{Inlier DRG Payment} / \text{Geometric Mean}$ = $\$1,668.50 / 1.4$ = \$ 1,191.79
Cost Outlier threshold	= $\text{Inlier DRG payment} \times (1 + \text{IDME Factor}) + \text{Fixed Loss Threshold} \times (\text{Labor Portion} \times \text{Wage Index} + \text{Non-Labor Portion}) \times \text{NOSCAASOTC}$ = $\$1,668.50 \times (1 + 0.3498) + \$19,226.00 \times (0.711 \times 0.8584 + 0.289 \times 0.918)$ = \$ 18,124.79
Transfer Adjusted Cost Outlier Threshold (No Transfer Adjustment)	= $\text{Cost Outlier Threshold} \times 1$ = $\$18,124.79 \times 1$ = \$ 18,124.79
Cost Outlier payment	= $(\text{Billed Charges} \times \text{Cost-to-charge Ratio} - \text{Transfer Adjusted Cost Outlier Threshold}) \times \text{Marginal Cost Factor}$ = $(\$9,571.93 \times 0.5073 - \$18,124.79) \times 0.8$ = \$ -
DRG payment (Short LOS Outlier)	= $\text{Inlier DRG payment} \times (1 + \text{IDME Factor})$ = $\$1,668.50 \times (1 + 0.3498)$ = \$ -

Appendix J

Claim Information				FY 2002 Policy Information	
Input		Output			
Billed Charges	\$ 3,755.97	DRG Weight	1.4362	ASA	\$ 3,568.55
LOS	1	Geometric Mean	4.0	Labor Portion	71.10%
DRG	14	Arithmetic Mean	5.8	Non-Labor Portion	28.90%
Discharge Status	01	Short LOS Threshold	1	Fixed Loss Threshold	\$ 19,226.00
		Transfer Flag	0	Cost-to-charge Ratio	0.5073
Hospital Specific Information				Marginal Cost Factor	0.80
Input		Output		NOSCAASOTC	0.9180
# Intens & Residents	247.5	I-R Ratio	0.5500	Children's Hospital Differential	\$ -
# of Beds	450	IDME Factor	0.3498	Children's Hospital Outlier Adjustment Factor	0.00
IDME Factor (override)	0.0000	Wage Adjusted ASA	\$ 3,209.28	Payment Summary	
Wage Index	0.8584	Cost Outlier Threshold	\$ 22,094.24	DRG Inlier Payment	\$ -
Large Urban?	<input checked="" type="checkbox"/>			Short Stay Outlier Payment	\$ 2,145.41
Children's Hospital?	<input type="checkbox"/>			Cost Outlier Payment	\$ -
SPECIFIC CEREBROVASCULAR DISORDERS EXCEPT TIA				Transfer Payment	\$ -
				Total Payment	\$ 2,145.41
Payment Details					
Wage Adjusted ASA	= [ASA*Labor Portion*Wage Index+ASA* Non-Labor Portion] = [\$3,568.55*0.711+0.8584*\$3,568.55*0.289] = \$3,209.28 = \$ 3,209.28				
Inlier DRG payment	= DRG Weight*Wage Adjusted ASA = 1.4362*\$3,209.28 = \$ 4,609.16				
IDME Adjusted Inlier DRG Payment	= Inlier DRG Payment*(1+IDME Factor) = \$4,609.16*(1+0.3498) = \$ 6,221.68				
Short LOS Outlier Payment	= minimum of [2*LOS*(Inlier DRG Payment/Arithmetic Mean LOS) OR Inlier DRG Payment]*(1+IDME Factor) = minimum of [2*1*(\$4,609.16/5.8) OR \$4,609.16]*(1+0.3498) = \$ 2,145.41				
Per diem (for use with transfers only)	= Inlier DRG Payment/Geometric Mean = \$4,609.16/4 = \$ 1,152.29				
Cost Outlier threshold	= Inlier DRG payment*(1+IDME Factor)+Fixed Loss Threshold*(Labor Portion*Wage Index+Non-Labor Portion)*NOSCAASOTC = \$4,609.16*(1+0.3498)+\$19,226.00*(0.711*0.8584+0.289)*0.918 = \$ 22,094.24				
Transfer Adjusted Cost Outlier Threshold (No Transfer Adjustment)	= Cost Outlier Threshold*1 = \$22,094.24*1 = \$ 22,094.24				
Cost Outlier payment	= (Billed Charges*Cost-to-charge Ratio-Transfer Adjusted Cost Outlier Threshold)*Marginal Cost Factor = (\$3,755.97*0.5073-\$22,094.24)*0.8 = \$ -				
DRG payment (Short LOS Outlier)	= Inlier DRG payment*(1+IDME Factor) = \$4,609.16*(1+0.3498) = \$ -				

Appendix K

Claim Information			
Input		Output	
Billed Charges	\$ 4,146.16	DRG Weight	0.7827
LOS	1	Geometric Mean	2.4
DRG	138	Arithmetic Mean	3.0
Discharge Status	01	Short LOS Threshold	1
		Transfer Flag	0
Hospital Specific Information			
Input		Output	
# Interns & Residents	247.5	I-R Ratio	0.5500
# of Beds	450	IDME Factor	0.3498
IDME Factor (override)	0.0000	Wage Adjusted ASA	\$ 3,209.28
Wage Index	0.8584	Cost Outlier Threshold	\$ 19,263.25
Large Urban?	<input checked="" type="checkbox"/>		
Children's Hospital?	<input type="checkbox"/>		
CARDIAC ARRHYTHMIA & CONDUCTION DISORDERS W CC			

FY 2002 Policy Information	
ASA	\$ 3,568.55
Labor Portion	71.10%
Non-Labor Portion	28.90%
Fixed Loss Threshold	\$ 19,226.00
Cost-to-charge Ratio	0.6073
Marginal Cost Factor	0.80
NOSCAASOTC	0.9180
Children's Hospital Differential	\$ -
Children's Hospital Outlier Adjustment Factor	0.00
Payment Summary	
DRG Inlier Payment	\$ -
Short Stay Outlier Payment	\$ 2,260.46
Cost Outlier Payment	\$ -
Transfer Payment	\$ -
Total Payment	\$ 2,260.46

Payment Details	
Wage Adjusted ASA	$= [ASA * Labor Portion * Wage Index + ASA * Non-Labor Portion]$ $= [\$3,568.55 * 0.711 + 0.8584 * \$3,568.55 * 0.289]$ $= \$3,209.28$ $= \$ 3,209.28$
Inlier DRG payment	$= DRG Weight * Wage Adjusted ASA$ $= 0.7827 * \$3,209.28$ $= \$ 2,511.90$
IDME Adjusted Inlier DRG Payment	$= Inlier DRG Payment * (1 + IDME Factor)$ $= \$2,511.90 * (1 + 0.3498)$ $= \$ 3,390.69$
Short LOS Outlier Payment	$= \text{minimum of } [2 * LOS * (Inlier DRG Payment / Arithmetic Mean LOS) \text{ OR } Inlier DRG Payment] * (1 + IDME Factor)$ $= \text{minimum of } [2 * 1 * (\$2,511.90 / 3) \text{ OR } \$2,511.90] * (1 + 0.3498)$ $= \$ 2,260.46$
Per diem (for use with transfers only)	$= Inlier DRG Payment / Geometric Mean$ $= \$2,511.90 / 2.4$ $= \$ 1,046.63$
Cost Outlier threshold	$= Inlier DRG payment * (1 + IDME Factor) + Fixed Loss Threshold * (Labor Portion * Wage Index + Non-Labor Portion) * NOSCAASOTC$ $= \$2,511.90 * (1 + 0.3498) + \$19,226.00 * (0.711 * 0.8584 + 0.289 * 0.918)$ $= \$ 19,263.25$
Transfer Adjusted Cost Outlier Threshold (No Transfer Adjustment)	$= Cost Outlier Threshold * 1$ $= \$19,263.25 * 1$ $= \$ 19,263.25$
Cost Outlier payment	$= (Billed Charges * Cost-to-charge Ratio - Transfer Adjusted Cost Outlier Threshold) * Marginal Cost Factor$ $= (\$4,146.16 * 0.6073 - \$19,263.25) * 0.8$ $= \$ -$
DRG payment (Short LOS Outlier)	$= Inlier DRG payment * (1 + IDME Factor)$ $= \$2,511.90 * (1 + 0.3498)$ $= \$ -$

Appendix L
Case Study CMAC Prospective Payment Model
Brooks Army Medical Center

19 Most Common National DRGs in 2002

DRG #	Description	Direct Case (M2)				Historical Cost (M2)		% Change from CMAC to Average Cost/Day
		ALOS	Minimum	Maximum	LOS	Direct Case	Average Cost/Day (Direct Case)	
1	Heart failure and shock	330	1.00	27.00	4.92	\$1,064,055	\$4,533	-54.39%
2	Simple pneumonia and pleurisy, with comorbidities and complications (CC)	374	1.00	22.00	3.78	\$1,314,090	\$3,379	-56.07%
3	Chronic obstructive pulmonary disease	471	1.00	22.00	3.78	\$1,314,090	\$3,379	-56.07%
4	Major joint and limb reattachment procedures	245	1.00	22.00	3.78	\$1,314,090	\$3,379	-56.07%
5	Nutritional and miscellaneous metabolic disorders, with CC	196	1.00	10.00	2.68	\$1,314,090	\$3,379	-56.07%
6	Esophagus, gastroenterological and miscellaneous digestive disorders	184	1.00	10.00	2.68	\$1,314,090	\$3,379	-56.07%
7	Gastrointestinal hemorrhage with CC	123	1.00	10.00	2.68	\$1,314,090	\$3,379	-56.07%
8	Chest pain	190	1.00	14.00	2.47	\$1,314,090	\$3,379	-56.07%
9	Intracranial hemorrhage and stroke with infarct	252	1.00	29.00	5.08	\$1,314,090	\$3,379	-56.07%
10	Cardiac arrhythmia and conduction disorders with CC	186	1.00	31.00	5.42	\$1,314,090	\$3,379	-56.07%

*Prospective value based on ALOS of National direct case as reported in M2, and average cost/day as listed changes in DRG calculator.

19 Most Common National DRGs in 2002

DRG #	Description	Direct Case (M2)				Historical Cost (M2)		% Change from CMAC to Average Cost/Day
		ALOS	Minimum	Maximum	LOS	Direct Case	Average Cost/Day (Direct Case)	
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*RMP values from OASD (Health Affairs) briefing from June 2004. Used Business Plans and Prospective Payment Budgeting.

**Deviation average value per day based on 15% of RMP average value for 2002 and CMAC prospective value.

Sensitivity Analysis

DRG #	Description	Direct Case (M2)				Historical Cost (M2)		% Change from CMAC to Average Cost/Day
		ALOS	Minimum	Maximum	LOS	Direct Case	Average Cost/Day (Direct Case)	
1	Heart failure and shock	330	1.00	27.00	4.92	\$1,064,055	\$4,533	-54.39%
2	Simple pneumonia and pleurisy, with comorbidities and complications (CC)	374	1.00	22.00	3.78	\$1,314,090	\$3,379	-56.07%
3	Chronic obstructive pulmonary disease	471	1.00	22.00	3.78	\$1,314,090	\$3,379	-56.07%
4	Major joint and limb reattachment procedures	245	1.00	22.00	3.78	\$1,314,090	\$3,379	-56.07%
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